CLAIMS

1. A method of forming a vacuum microelectronic device comprising:

forming at least one electron emitter on a substrate;

applying a first electric field to move a portion of the at least one electron emitter in a direction toward the first electric field; and

maintaining the at least one electron emitter in the direction after removing the first electric field.

2. The method of claim 1 wherein applying the first electric field includes applying the first electric field to have a value of at least 0.2 to 50 volts per micro-meter, and further including extracting a current from the at least one electron emitter wherein the at least one electron emitter has an internal current density of at least $1X10^4$ amperes per square centimeter.

3. The method of claim 1 further including subsequently operating the at least one electron emitter using a second electric field having a value that is less than the value of the first electric field.

4. The method of claim 3 wherein using the second electric field includes using the second electric field having a value that is less than ninety percent of the value of the first electric field.

5. The method of claim 1 wherein applying the first electric field includes using a sequence of alternately applying and removing the first electric field.

6. The method of claim 1 wherein forming at least one electron emitter on a substrate includes forming at least one nanotube emitter on the substrate.

7. A method of forming a vacuum microelectronic device comprising:

providing a substrate having an attachment site;

forming a plurality of electron emitters on the attachment site wherein at least one of the plurality of electron emitters has a first direction and another one of the plurality of electron emitters has a second direction that is different from the first direction;

applying a first electric field extending in a third direction away from the substrate wherein the first electric field has a value that is sufficient to extend a distal end of the at least one of the plurality of electron emitters to a position toward a direction of the first electric field; and

maintaining the at least one of the plurality of electron emitters in the position after removing the first electric field.

8. The method of claim 7 wherein applying the first electric field further includes extracting current from the at least one of the plurality of electron emitters, the current having a current density that is at least $1X10^4$ amperes per square centimeter.

9. The method of claim 7 further including subsequently operating the at least one of the plurality of electron emitters using a second electric field having a value that is less than ninety per cent of the value of the first electric field.

10. The method of claim 7 further including:

forming an anode overlying the at least one of the plurality of electron emitters wherein applying the first electric field includes applying the first electric field between the at least one of the plurality of electron emitters and the anode; and

forming a gate electrode proximal to and displaced from the substrate.

11. The method of claim 10 further including floating the gate electrode to a potential determined by the first electric field while applying the first electric field.

12. The method of claim 10 further including applying a first potential to the gate electrode wherein the first potential is no greater than a second potential determined by the first electric field while applying the first electric field.

13. A method of forming a vacuum microelectronic device comprising:

forming a plurality of electron emitters on an attachment site of the vacuum microelectronic device;

extracting electrons from the plurality of electron emitters at a first current density sufficient to extend a distal end of at least one of the plurality of electron emitters to a direction away from the attachment site; and

maintaining the at least one of the plurality of electron emitters toward the direction after stopping the electron extraction.

14. The method of claim 13 further including:

forming an anode overlying the at least one of the plurality of electron emitters; and

forming a gate electrode proximal to and displaced from the plurality of electron emitters.

15. The method of claim 14 further including forming a phosphor on a surface of the anode.

16. The method of claim 14 wherein extracting electrons includes applying a first electric field between the anode and the at least one of the plurality of electron emitters and subsequently operating the at least one of the plurality of electron emitters using a second electric field having a value that is less than ninety per cent of the value of the first electric field.

17. The method of claim 13 further including operating the at least one of the plurality of electron emitters by extracting electrons at a second current density having a value that is less than one-half of the value of the first current density.

18. The method of claim 13 wherein forming the plurality of electron emitters on the attachment site further includes forming a plurality of attachment sites and a plurality of electron emitters on each attachment site.

19. The method of claim 18 further including forming an anode overlying each attachment site.

20. The method of claim 13 wherein extracting electrons includes using a sequence of alternately extracting electrons and ceasing the electron extraction.